

Water Quality Degradation in Oligotrophic Pend Oreille Basin

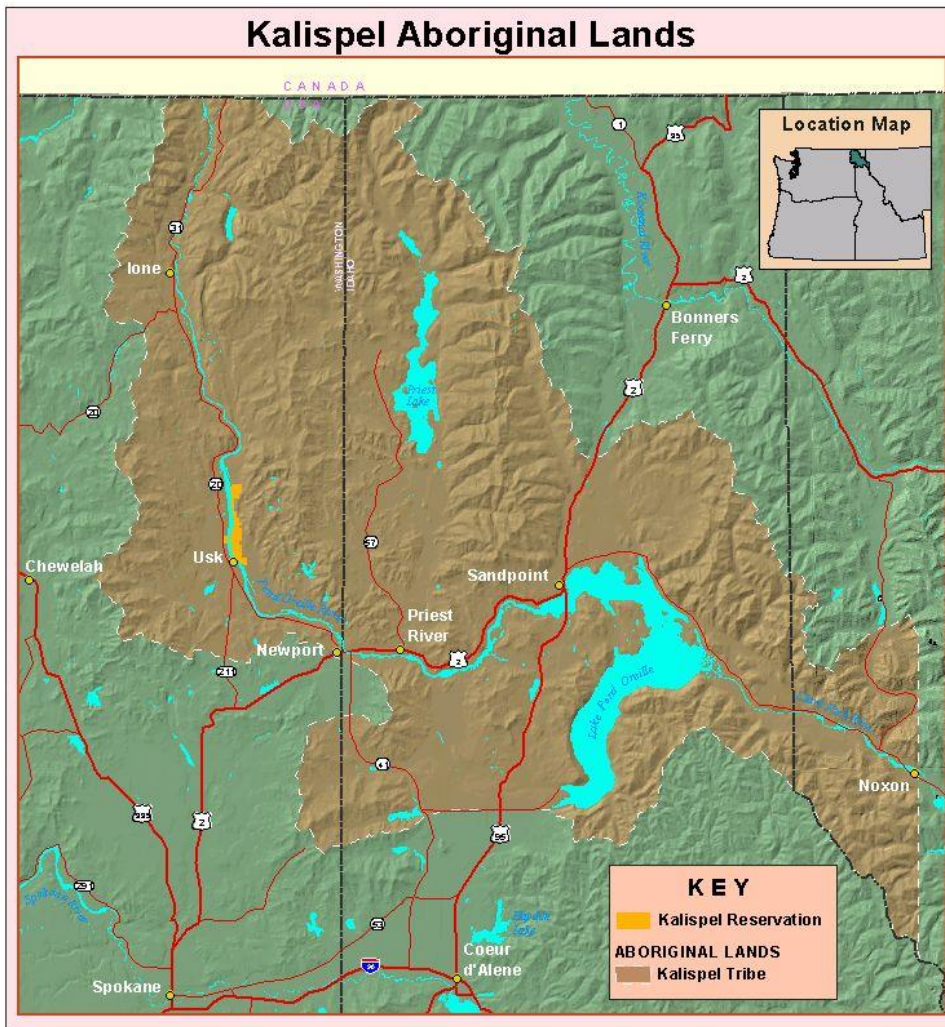
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Pend Oreille River Nutrient Considerations



Kalispel Lands



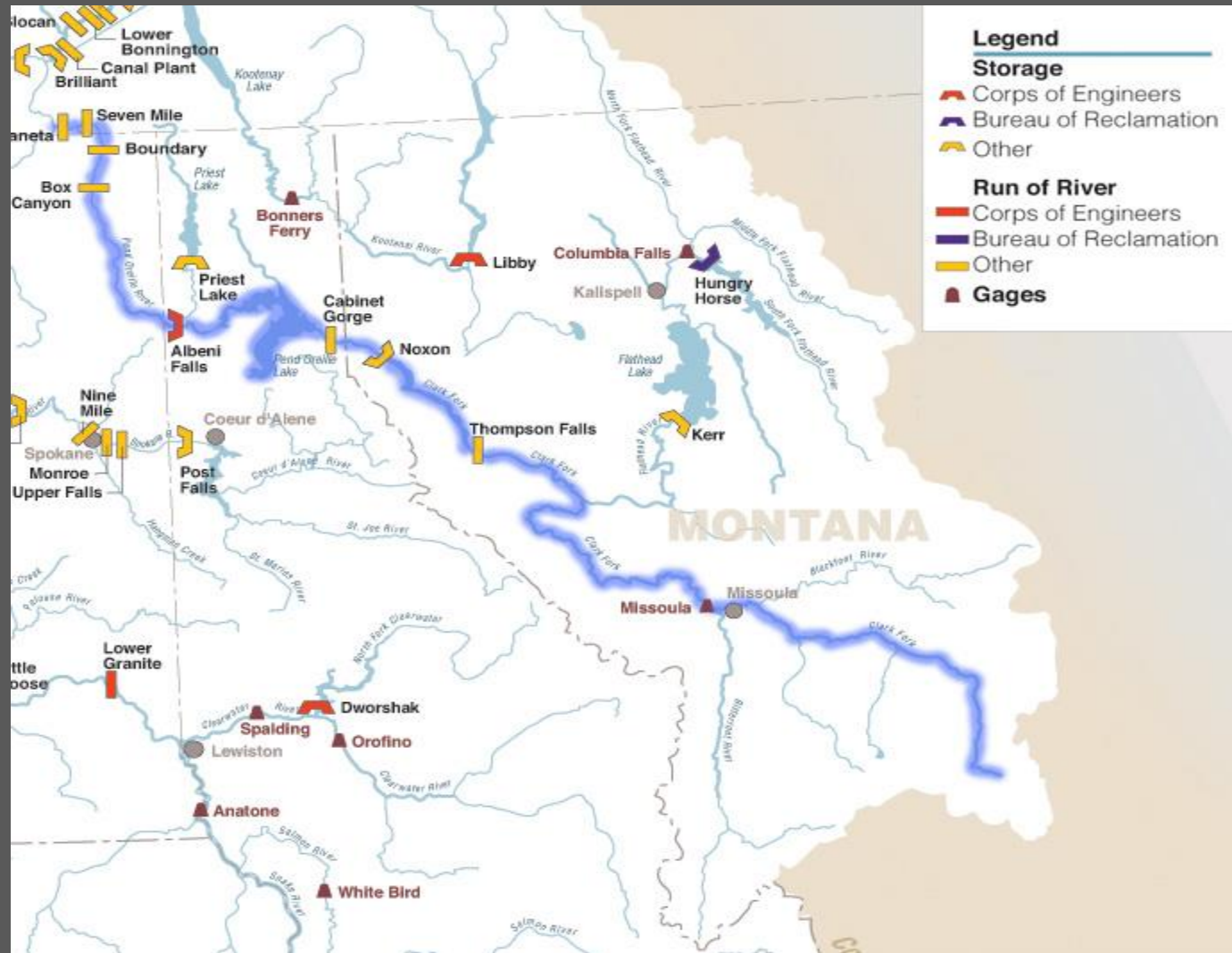
- Kalispel Adjudicated Aboriginal Boundary
 - NE Washington, Idaho and Western Montana
 - Over 2.3 million acres
- Reservation
 - NE Washington
 - 4,750 acres
 - 1,900 additional acres in Trust status since 1997 (with cons. easements)



Pend Oreille Basin Westslope Cutthroat Trout and Bull Trout (“Salmon Trout”)

Cold-Clean-Complex-Connected Habitat

Connecting Habitat for Adfluvial Salmonids







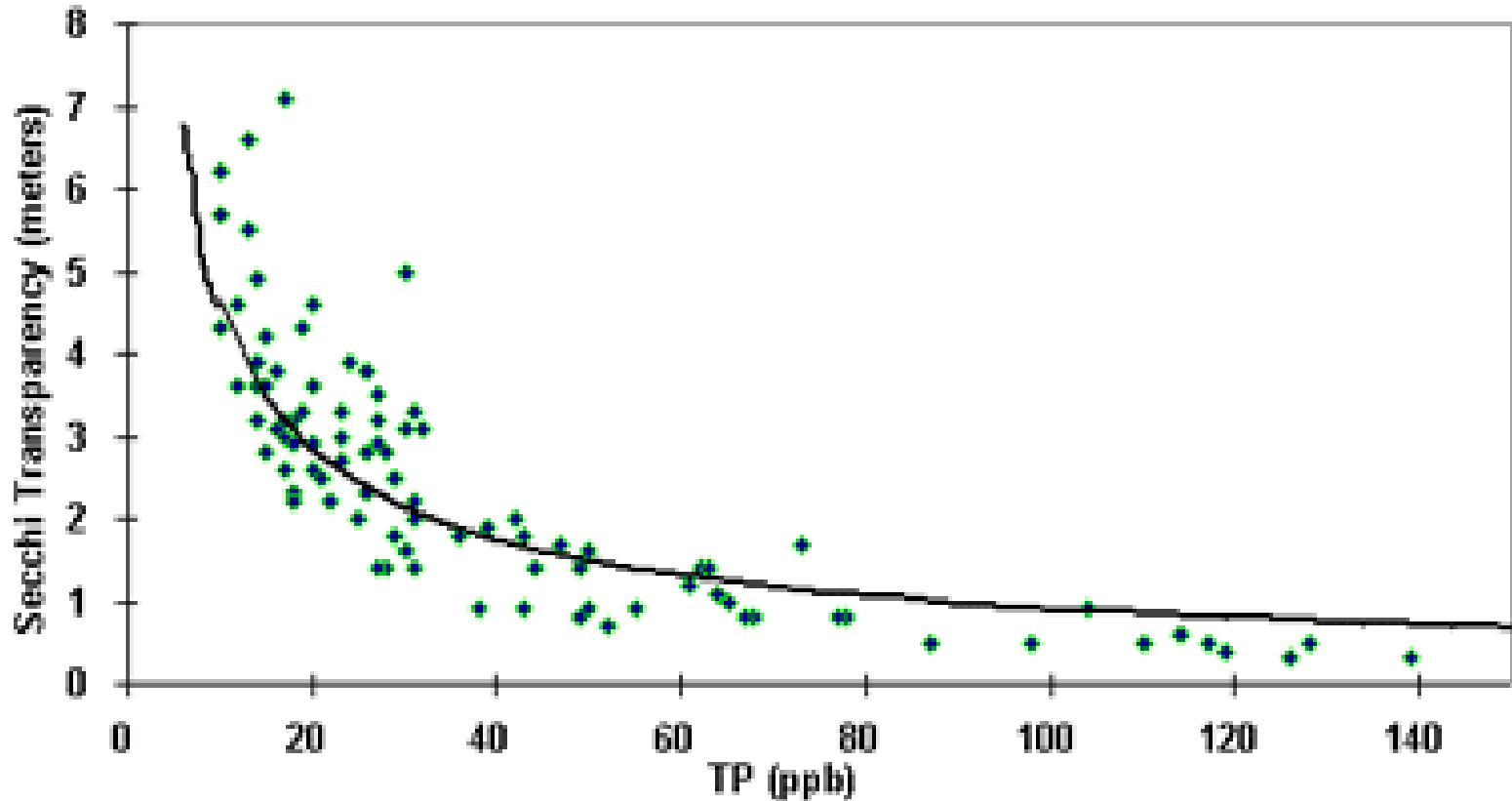




Nutrient Targets in Clark Fork-Pend Oreille

- Tri-State Water Quality Council (>\$1 million federal)
- MT-ID MOA - Lake Pend Oreille open water TP target 7.3 ug/L (area-weighted euphotic zone geometric mean)
- The MT Clark Fork River Voluntary Nutrient Reduction Program 1998-2008
 - Two actions >85% TP reduction from wastewater discharges in MT
 - 1) Missoula, MT WWTP nutrient removal
 - 2) Frenchtown, MT Pulp Mill closure (Dec-09)
- ID TMDL - Lake Pend Oreille near-shore 9 ug/L avg
- Pend Oreille R. arm listed -then delisted for phosphorus in ID downstream of Sandpoint WWTP
- Pend Oreille River listed -then delisted for pH violations in WA

Phosphorus -Transparency - Productivity



From: Lake Access, Minnesota EMPACT Project

NUTRIENT CRITERIA DEVELOPMENT IN WASHINGTON STATE (2004):

Phosphorus - Triggers for Riverine Systems

- Changes to water quality due to excess nutrients are expressed first through the impacts to other more sensitive water quality criteria
- Before nuisance levels of algal growth occur and aesthetics are noticeably impaired, streams and rivers will have violations of the state's dissolved oxygen, pH, and turbidity criteria
- These criteria, which are designed to provide full support to sensitive aquatic life communities, have been found to be more reliable indicators of trophic health

NUTRIENT CRITERIA DEVELOPMENT IN WASHINGTON STATE (2004):

Phosphorus - Triggers for Riverine Systems

-The second key indirect indicator of river eutrophication is the state's pH criteria. Excess nutrients in the state are identified by increasing trends in pH concentrations and by exceedances of the upper pH levels established for the water bodies. After such problems are identified, the criteria serve as targets for restoration and clean up that directly incorporate the causal effect of nutrients

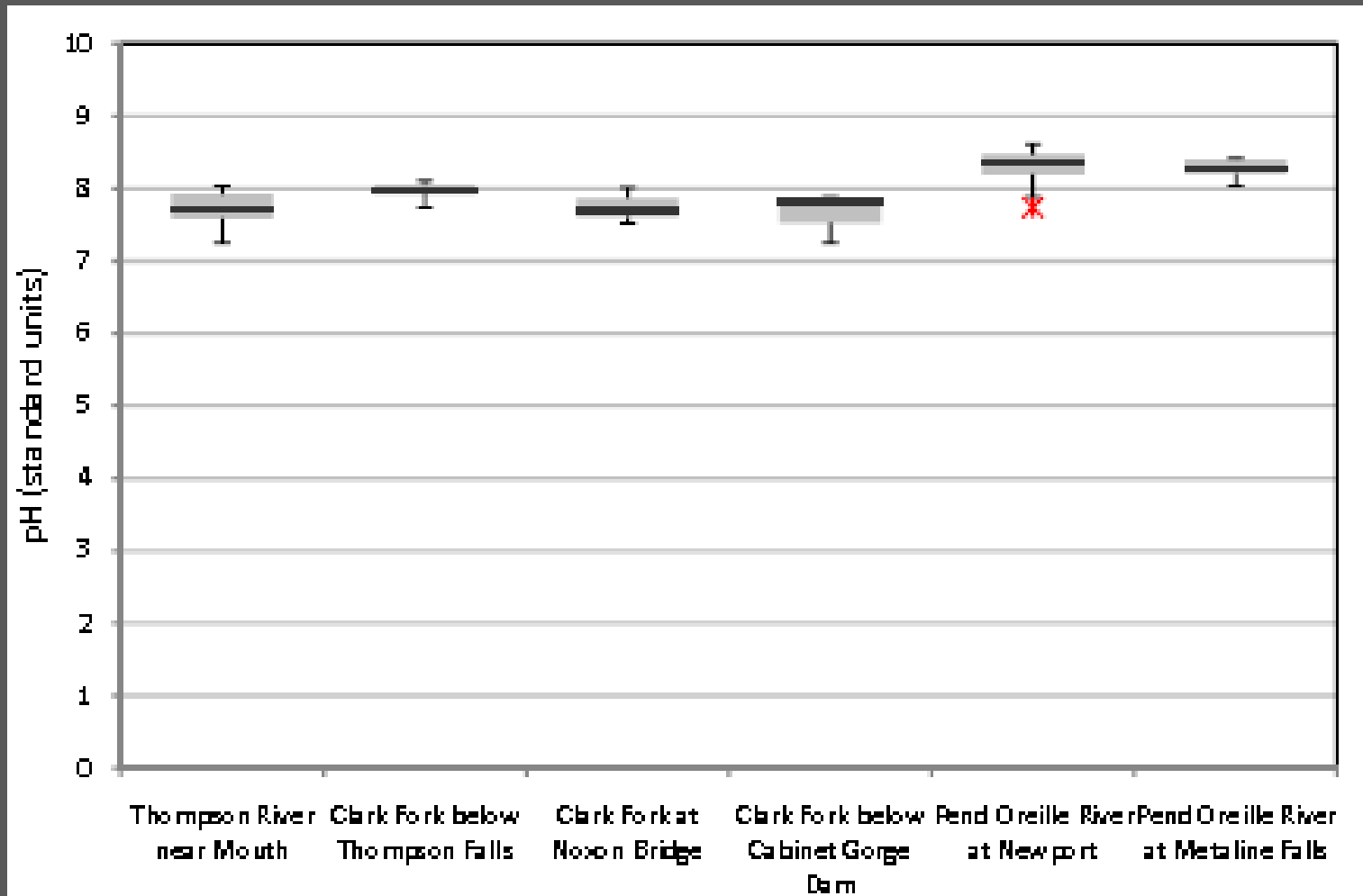
NUTRIENT CRITERIA DEVELOPMENT IN WASHINGTON STATE (2004):

Phosphorus - Triggers for Riverine Systems

- Violations of these other trigger criteria, result in 303(d) listings and comprehensive water body-specific studies that are used to establish clean up requirements.
- These system-wide remedies examine the role of nutrients as well as other key facilitating parameters such as flows, temperature, and BOD when setting requirements for returning full health to the water body

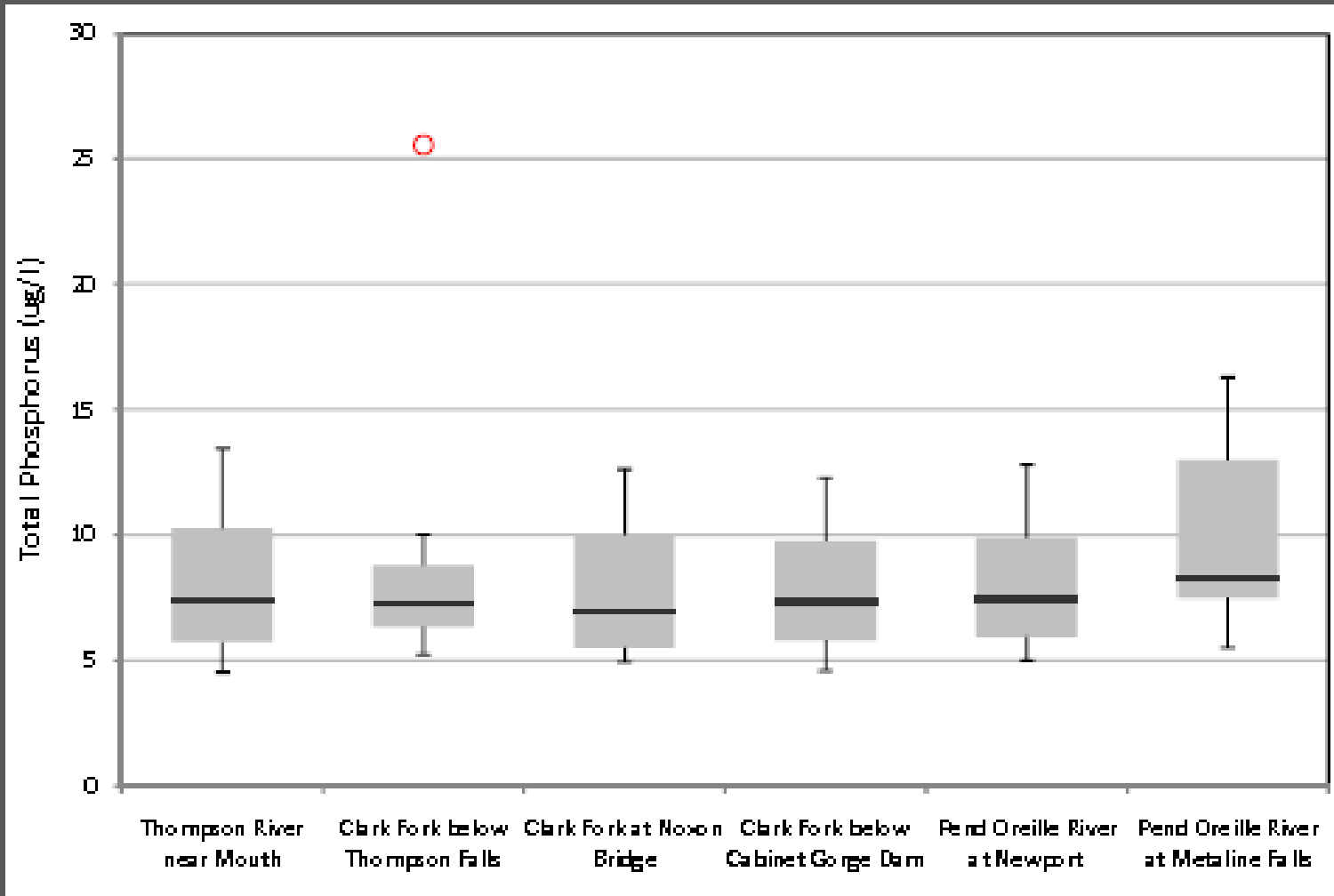
Clark Fork – Pend Oreille 2010 pH Comparison

(TSWQC, 2011)



Clark Fork – Pend Oreille 2010 TP Comparison

(TSWQC, 2011)



Human Caused Contribution to Primary Productivity and pH in the Pend Oreille River

- **Changes in low-flow channel morphometry by reservoirs**
 - Expanded shallow habitat for macrophyte colonization
 - Reduced velocities & increased residence time especially at @ low flow
- **Warmer water promoting primary growth rate and season length especially in shallow portions of reservoirs**
- **Continuous input of nutrients from WWTPs with mixing throughout the water column (almost all in euphotic zone)**
- **Phytoplankton production promoted especially in critical flow**
- **Macrophytes providing enhanced growing media for epiphyton**
- **Critical flow velocities in reservoir less limiting to epiphytic accrual**

Future Nutrient Management in the Pend Oreille River

- Acknowledge existing degradation contributed to by nutrients within the Pend Oreille River especially during critical conditions – not average flows
- Develop and adopt protective in-stream nutrient targets with equitable levels of aquatic resource protection throughout the Pend Oreille Basin
- Begin developing nutrient control strategies for the impounded river down-stream of the Lake
- Implement the most cost effective strategies for nutrient reduction to begin a measurable reverse in nutrient loading from WWTPs and other sources

Questions?

